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Children and Adults in the Income Distribution

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1. Introduction

If we group families or households by their size, as measured by number of persons, the common finding is that the larger families or households show larger income per unit. But if we divide the family or household income by the number of members, per person income is larger in the smaller families or households, and smaller in the larger units. An illustration of the positive association between the size of family and income per family, and of the negative association between size of family and family income per person is provided in Table 1 below for the United States in 1969-70 (money income is for calendar 1969 and size of family is shown for March 1970). Income per family ranged from a low of $8.8 thousand for a family of 2 persons to $12.2 thousand for a family of 5 or 6 persons, and $11.5 thousand for a family of 7 persons or more. Family income per person declined sharply from $4.4 thousand for families of 2 persons to $1.4 thousand for families of seven or more.[1]

Larger families or households usually contain a higher proportion of children among the members and a smaller proportion of adults than the smaller families or households. It follows that children are more concentrated than adults in larger families or households, and, consequently, in families or households with lower per person income. It also follows that there will be a disparity between the lower average income per person in families or households with children, and the higher average income per

person in families or households without children (or with low proportions of children to adults). Discussion in this paper explores the differences in per person income between children and adults in the income distribution.

We use here statistics for the United States, and for families rather than for households, because of the requirements of the data needed to measure fully the gap between average per capita income levels of children and adults.[2] As will be shown in the first section of the paper, a complete measure of the gap requires that the multi-person units (whether families or households) be classified by the number of children--and such classifications are at hand only for this country (except for incomplete data for the Philippines for 1970-71) and for families rather than households.[2]

Following the first section, which deals with a shift from distribution of families by number of persons to the distribution by number of children, we consider in the second section the effect of inclusion of unrelated individuals. This introduces substantial inequality in the number of adults per unit, among units (families and unrelated individuals) grouped by number of children. But the effect on inequality in per person income between children and adults, the main finding in this paper, is moderate: it widens such inequality, but by a narrow margin.

The third section explores the question whether differences among families by number of children persist within the several age-of-head groups. The finding that these differences are found also within the several age-of-head groups indicates that the associated disparities in

income per person among families with differing number of children will probably persist even when cumulated over the full lifetime span of the families.

In the fourth section, we use the cross section per person income patterns illustrated in the preceding sections to suggest time patterns of per person income for imaginary types of households, assuming substantial differences among them in the number of children, born and surviving during the lifecycle span of each household type. While the illustrative cases are necessarily oversimplified, and to that extent unrealistic, they help us visualize more clearly the implications of the lower levels of person income among children and adults in larger families, in the shares of both groups in the current income and of the children, when adults, in the prospective income.

The concluding comments emphasize the main and somewhat puzzling finding relating to the income disparities among children and adults associated with differences in number of children in the family; and consider briefly the dependence of this finding on assumptions embodied in the definitions of child, adult, family, consumer unit, and income underlying the data used here, and of possible bearing on identical or roughly similar data elsewhere.

2. Distribution of Families by Number of Persons and by Number of Children

Table 1 relates to 1969-70 because the demographic data for March 1970 are available not only from the Bureau of the Census Current Population Survey (which also provides the data on money income in calendar 1969),

Table 1

Children and Adults, Distribution of Families

by Number of Persons per Family, United States, 1969-70

A. Shares of Families (F), Persons (P), Children under 18 (Pc), Adults 18 & over (Pa), by Size Classes of Families

Number of persons in family	% of all F (1)	% of all P (2)	Pc per F (3)	Pa per F (4)	% of all Pc (5)	% of all Pa (6)	% of all P: Pc (7)	% of all P: Pa (8)
1. 2 persons	34.4	19.0	0.06	1.94	1.5	29.7	0.5	18.5
2. 3 persons	20.9	17.3	0.72	2.28	11.0	21.1	4.1	13.2
3. 4 persons	19.3	21.4	1.66	2.34	23.5	20.0	8.9	12.5
4. 5 persons	12.5	17.3	2.56	2.44	23.6	13.5	8.9	8.4
5. 6 persons	6.8	11.2	3.43	2.57	17.1	7.7	6.4	4.8
6. 7 & over	6.1	13.8	5.24	2.98	23.3	8.0	8.8	5.0
7. Total and averages	51.24	185.40	1.36	2.26	69.79	115.61	37.6	62.4

B. Money Income (Y) per person, All Persons, Children, and Adults

	Y/F $	Y/P $	Y/P multiplied by proportion in total P of:			% in total Y/P of:		
			P	Pc	Pa	Col. 3	Col. 4	Col. 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8. 2 persons	8,788	4,394	835	22	813	28.6	0.8	27.8
9. 3 persons	10,557	3,519	609	144	465	20.8	4.9	15.9
10. 4 persons	11,855	2,964	634	264	370	21.7	9.0	12.7
11. 5 persons	12,222	2,444	423	218	205	14.5	7.5	7.0
12. 6 persons	12,180	2,030	227	130	97	7.8	4.5	3.3
13. 7 & over	11,544	1,404	194	124	70	6.6	4.2	2.4
14. Totals or averages	10,577	2,922	2,922	902	2,020	100.0	30.9	69.1

Table 1--continued

C. Measures of Disparity Among:

		Families, by number of persons (F-P) (1)	Families, by number of children (F-Pc) (2)	Families, by number of adults (F-Pa) (3)	Col. 2, X proportion of Pc (4)	Col. 3 X proportion of Pa (5)	Families, by Y per family (F-Y) (6)	Persons by Y/P (7)
15.	TDMs	38.0	85.6	9.4	32.3	5.9	11.6	26.8
16.	Ginis	0.248	0.551	0.064	0.207	0.040	0.074	0.175

D. Derivation of Income Disparities among Three Groups:

Children (Pc): Adults with Children (Pca):

Adults without Children (Paa)

		% in total P (1)	% in total Y (2)	Difference (3)	Per Person Income Relative (4)	Per Person Income ($) (5)
17.	Pc	37.6	30.9	-6.7	0.822	2,402
18.	Pca	43.9	41.3	-2.6	0.941	2,750
19.	Paa	18.5	27.8	9.3	1.503	4,392
20.	Total, TDM, average	100.0	100.0	18.6	1.000	2,922

Notes:

The major source of the data, except for the breakdown in Panel A between children and adults in columns 3 and 4, is Bureau of the Census, Income in 1969 of Families and Persons in the United States, Current Population Reports, Series P-60, no. 75, Washington, December 1970 (referred to henceforth as Source I). The distributions in Panel A, Columns 1 and 2, are from Table 18, p. 42, and so are the average incomes per family in col. 1, lines 8-14.

The allocation between children and adults within each size class of families is estimated on the basis of the distribution shown in Bureau of the Census, Census of Population 1970, Subject Reports, Final Report PC(2)-4A, Family Composition, Washington, 1973, Table 3, pp. 7ff and Table 7, pp. 55ff. The Census data yield a somewhat higher proportion of children to total population in the families than is indicated in the Source I data, and

Table 1-continued

Notes--continued

we adjusted the ratios proportionately.

The discrepancy just noted is due largely to the inclusion of persons in college dormitories in their parental homes in the coverage in Source I, whereas the Census totals place this group among those in group quarters, i.e. outside the family and household population (see Bureau of the Census, Census of Population 1970, Subject Reports, Final Report PC(2)-4B, Persons by Family Characteristics, Washington 1973, Table 1, p. xi). The needed adjustment was, however, quite small, involving a reduction of the total of children and their ratios to all persons within each size class by about 2.5%).

Line 7: The entries are as follows: Columns 1, 2, 5, and 6--total number of families and persons, all in million. The data, and all other demographic data, refer to March 1970; the income data refer to the calendar year 1969. The entries in columns 3 and 4 are the average (arithmetic mean) number of children and of adults per family. The entries in cols. 7 and 8 are the percentages of children and of adults in the total population within the families.

Line 14: The entries in cols. 1 and 2 are the arithmetic mean income (in $) per family and per person, for the country as a whole. Those in columns 3-5 are the sums of entries in the corresponding columns, lines 8-13; and so are the entries in columns 6-8.

Panel C

The entries here are the measures of disparity or inequality, derivable from the distributions of families by number of persons, by number of children, and by number of adults (all in Panel A); and of families by income per family and of persons by family income per person (derivable from Panels A and B).

Table 1--continued

Notes--continued

As indicated in the discussion of these measures in the text, we expect to find an additive relation between the measures for distribution of families by children and adults and by total persons, when the measures for F-Pc and F-Pa are weighted by the proportions of children and adults in the total population within families. We also expect to find an additive relation between the measures for distribution of families by the number of persons, and the two measures for F-Y and P-Y respectively.

Panel D

Given the tiny share of children in the population of persons in two person families, the latter group is identified here as that of adults without children.

With this identification, the percentage shares in columns 1 and 2 of Panel D are derivable directly from columns 7 and 8, lines 1-7 and 8-14.

The entry in line 20, column 3 is the TDM for the disparity between P and Y of the three broad groups. It can be compared with the TDM for P-Y, in line 15, col. 7.

but also from the 1970 Census of Population. The purpose of the table is to demonstrate how important is the presence of children for size-differences among families by the number of persons; and, hence, also for differences in per capita income among the large and the small families. Furthermore, in permitting a comparison with the distribution of the same families by number of children (in Table 3 below), Table 1 demonstrates that the distribution by number of persons fails to provide a full measure of the relative income levels of children, and hence of the income disparity between children and adults.

The percentage shares in Panel A provide the basis of measuring inequality in the distribution of families by number of persons, and separately by number of children and adults within the same size-of-family classes. Two measures of inequality are used. The first, total disparity measure (TDM), is the sum of differences, signs disregarded, between the percentage shares of the same classes in two related variables (e.g. in number of families and in number of persons; or in number of families and in total income). Each difference in percentages can be viewed as the relative deviation of the class mean from the over-all mean, weighted by the percentage share of the class in total frequency. Thus, the difference in line 1 between the share of the 2 person class in total families and in total persons, columns 1 and 2, or -15.4%, can be derived as relative deviation of the class mean from the over-all mean, i.e. (2.00-3.62)/3.62, or -0.445, weighted or multiplied by the weight of the 2 person class in all families, i.e., by 34.4%. The measure is simple and makes for easy identification

of the frequency classes that are responsible for most inequality. It is also a simplified form of the Gini coefficient of concentration, if converted to a proper fraction by relating total disparity to 200, the maximum possible. This proper fraction then represents 1 minus the ratio of two areas. In the denominator is the total area between the diagonal of perfect equality in the Lorenz curve and the two coordinates at 0-0 and 1.0-1.0 points. In the numerator is the area between the equality diagonal and a broken line, the first segment of which is a straight line from the 0-0 point to the point where the arithmetic mean value of the Y variable is reached on the Y-axis and the corresponding cumulative frequency proportion is reached on the X-axis, and the 2nd segment is the line from the latter point to the 1.0-1.0 point in the upper corner.[3]

The other measure is the familiar Gini coefficient, calculated here from the simple formula in which it equals 1 minus the sum of all classes or products (f_{i+1} minus f_i)(y_i+y_{i+1}), where $\underline{f}$ are the cumulated fractions of total frequencies, and $\underline{y}$ are the cumulated fractions of total magnitude, the cumulations being from the lowest to the highest magnitude classes. It will be noted that the TDMs, when expressed as proper fractions and divided by 2 (or some reasonable approximation to it), are consistently lower than the Ginis, as they should be; but the differences between the two measures are in the same direction and of roughly the same magnitudes.

The first finding in Table 1 to be noted is the relation between the inequality in the size of families observed in the comparison of Columns 1 and 2 of Panel A, and in the inequality of income per family and of per person

income for the same family size-classes in Columns 1 and 2 of Panel B. The size-differences among families are measured by a TDM of 38.0 and a Gini coefficient of 0.248 (lines 15 and 16, col. 1), fairly substantial magnitudes. As the discussion in the paper cited in footnote 1 indicates, given the positive correlation between per family income and family size and the negative correlation between per person income and family size (see columns 1 and 2 of Panel B), the TDM (or Ginis)for size-differences among families is the minimum to which the TDMs (or Ginis) for income per family and per person income, for the same size-classes should add. And, indeed, we find in Table 1 that the TDMs for F-Y and P-Y, 11.6 and 26.8, add to 38.4, slightly larger than the 38.0 shown for F-P (line 15); and that the relevant Gini coefficients, 0.074 add 0.175, add to 0.249, compared with 0.248 (line 16).

If size-differentials among families were of magnitudes smaller or larger than that shown in Table 1, and the associations between income and family size remained in the directions indicated, the TDMs (or Ginis) either for F-Y, or for P-Y, or for both, would have to differ from those in Table 1. The income disparity of particular interest here is that among size-classes of families by per person income--for it may be viewed as a direct contribution to the over-all distribution of income among the population by per capita income--a far more significant distribution than the usual one among families by income per family.

If the size-differentials among families are the dominant factor that produces the associated disparities in family income per family and in

family income per person, the sum of TDM, (or Ginis) of F-Y and P-Y will roughly equal TDM or Gini for F-P (but never fall short of it). Consequently, the larger the F-Y disparity, the smaller will be the P-Y income disparity. The F-Y disparity will be larger if the upward movement of per family income is greater with rise in family size; and it will be smaller the less the family income rises as the number of persons in the family rises. If then the distribution is like the one shown in Table 1, with TDM (or Gini) for F-Y, at 11.6(or 0.074)being less than a third of the F-P measures (or of the sum of the measures for F-Y and P-Y); and the TDM (or Gini) for P-Y is over two-thirds, the finding is due to the very limited rise in income per family (in col. 1 of Panel B) with the marked rise in the size of family. The movement is only from $8.8 thousand for the 2 person family to a peak of 12.2 thousand for the 5 and 6 person family--a rise of only about 40 percent--while the number of persons rises by a factor of 2.5 to 3. No wonder that per person income, in col. 2 of Panel B, drops so precipitously, from $4.4 thousand in the 2 person group to $1.4 thousand in the largest size group (with an average of 8.2 persons per family)--a drop to less than a third.

One clue to an explanation of the limited magnitude of the rise in per family income in column 1 of Panel B is provided by the movement of number of adults per family, for the size-classes of families, in column 4 of Panel A. While the number of adults per family rises as family size increases, the rise in the former is quite limited--as compared with that in the rise in the number of children; with the result that the ratio of adults

to children declines sharply as size of family rises (compare columns 3 and 4 of Panel A). If we can assume that children, as defined in Table 1, contribute little to the income of the family,[4] and hence that the adults are by far the major contributors to family income, the limited rise in the number of adults per family is one factor in the limited rise of family income in column 1 of Panel B.

But it is not the only factor, since income per family declines from a peak in the 5-person family, while the number of adults per family rises in families larger than 5 persons each. Such a result may be due to the existence of socio-economic groups, some of which are characterized by a lower income per family, and yet a larger number of both children and adults per family, than other groups. To use an illustration at hand relating to households, including one-person households in the United States for 1969-70 (see Source II, Table 3 and 5, pp. 13 and 15): in the 6.95 million households, with head among professional, technical and kindred workers, children under 18 average 1.283 per household and adults averaged 2.073--whereas for 8.68 million households with head among craftsmen, foremen, and kindred workers the averages per household were 1.493 children under 18 and 2.276 adults. Yet the average annual income per household for the professional group was $14.7 thousands, and that per household for the craftsmen group was $11.1 thousands. Obviously, as we moved up the size-classes of household by number of persons, in the larger size-classes there was likely to have been a greater proportion of craftsmen households, which would have depressed the average income

per household--and yet raised the average number of both children and adults per household.

The reasons for the limited rise in adults per family as the average size of family rises to over 8 persons can be explored, even if tentatively, at a later junction--in connection with Table 2 where we classify families by number of children (not of persons), and then seek to determine the level of adults per family with 0, 1, 2 etc. children. Here the comparison of the movements of the number of adults and children per family, in columns 4 and 3 of Panel A may be seen to bear on the second major finding suggested by Table 1--the role of children in making for the wide size-differentials among families by number of persons; and consequently also making for larger inequality in the distribution of per person income, among the size-classes in Panel B (i.e., the inequality measured by a TDM of 26.8 and a Gini coefficient of 0.175).

Panel A shows that the size-differentials among families by number of persons can be decomposed into inequalities among families in terms of children per family and in terms of adults per family--both for the common size-classes by the number of persons. This decomposition is provided in line 15, in which the TDM for F-Pc, 85.6, weighted by the proportion of children in total population (0.376), or 32.2, plus the TDM for F-Pa, 9.4, weighted by the proportion of adults in total population (0.624), or 5.9, add to 38.1 (as compared to 38.0, for F-P). Thus, while children account for only 37.6 percent of total <u>population</u>, they contribute over 80 percent of the <u>disparity</u> among families by size as measured by the

number of persons. The decomposition in terms of Ginis yields the same results. In other words, given the wide disparity between families by number of persons and the distribution of children within these size classes, it is the presence of children that is largely responsible for the wide inequality in size of families. Were the children eliminated, and only adults allocated among the families in the manner observed in Panel A, TDM (F-P) would have been only 9.4, compared with that of 38.0, and the Gini coefficient would have been only 0.064 instead of 0.248.[5]

If we apply the same assumption of omitting all children, while retaining the size-classes and the series of income per family now in column 1 of Panel B, the income per person in column 2 of Panel B, becomes, for successive size classes, in dollars; 4,530; 4,630; 5,066; 5,009; 4,739; and 3,890. The pattern, then, is not of a sustained and marked decline in per person income, but a rise from the 2 person to the 4 person families; and then a moderate decline except in the top size class. With this change, TDM, P-Y, becomes 5.2, instead of the 26.8 TDM now shown in line 15. In other words, just as with the omission of all children, the TDM, H-P, dropped to less than a quarter of its value, so did the associated TDM, P-Y drop to less than a fifth of its value.

Finally, to complete the notes on the findings in Table 1, we observe the classification, in Panel D, of population into three large groups: one comprises all children in the families, the second comprises all adults in families without children (here approximated by adults

in two person families, although, as Panel A shows, these units do include a tiny proportion of children).

The aspect of this classification that is of interest and worth noting is that the average income of adults in families with children is higher than the average income of children, although these adults and children are members of the identical group of families. The reason for this result is that, within the same group of families, children are more concentrated in the larger families, and hence in the low income per person families, than are the adults--their cohabiting relations. We shall find this difference even more important when we deal with distributions of families by number of children rather than of persons.

These latter distributions show the number of families with no children, one child, and so on up to 6 or more children, and also reveal the per family income for each of these number-of-children classes. But in order to derive from these distributions measures of the type shown in Table 1, we have to estimate the number of adults per family, in each class by the number of children per family. Fortunately, data are available to make such an estimate possible, abundantly for March 1970 and adequately for a few other years. The data in Table 2 related to March 1970, but there is no basis for assuming that the results for other years would be much different.

The broad result is that the average number of adults per family is roughly the same for the various classes of families distinguished by

Table 2

Adults (Pa) per Family (F), for Groups of Families by Number of Children under 18 (Pc), Census and Current Population Reports (CPR) Data, United States, March 1970

Groups by Number of Children	Families (mill.) (1)	Persons (mill.) (2)	Pc (mill.) (3)	Pa (mill.) (4)	P/F (5)	Pc/F (6)	Pa/F (7)
Census Data, All Families							
1. No Children	21.66	49.14	0	49.14	2.27	0	2.27
2. 1 child	9.70	31.19	9.70	21.49	3.22	1.0	2.22
3. 2 children	9.00	37.43	18.00	19.43	4.16	2.0	2.16
4. 3 and more	10.79	65.04	41.91	23.13	6.03	3.89	2.14
5. Total or average	51.15	182.80	69.61	113.19	3.57	1.36	2.21
CPR Data, Husband-Wife Families							
6. No children	18.42	41.94	0	41.94	2.28	0	2.28
7. 1 child	8.33	28.12	8.33	19.79	3.38	1.0	2.38
8. 2 children	8.13	34.66	16.27	18.39	4.26	2.0	2.26
9. 3 children	4.99	26.33	14.98	11.35	5.28	3.0	2.28
10. 4 children	2.53	16.05	10.12	5.93	6.34	4.0	2.34
11. 5 & more	2.04	16.35	11.15	5.20	8.02	5.47	2.55
12. Total or average	44.44	163.45	60.85	102.60	3.68	1.37	2.31
CPR Data, Female Head Families							
13. No children	2.217	5.028	0	5.028	2.27	0	2.27
14. 1 child	1.212	3.112	1.212	1.900	2.57	1.0	1.57
15. 2 children	0.959	3.408	1.918	1.490	3.55	2.0	1.55
16. 3 children	0.545	2.575	1.635	0.940	4.73	3.0	1.73
17. 4 & more	0.647	4.218	3.284	0.934	6.52	5.08	1.44
18. Total or average	5.580	18.341	8.049	10.292	3.29	1.44	1.84

Table 2--continued

Groups by Number of Children	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	CPR Data, Husband-Wife and Female Head Families						
19. No children	20.63	46.97	0	46.97	2.28	0	2.28
20. 1 child	9.54	31.24	9.54	21.70	3.27	1.0	2.27
21. 2 children	9.09	38.07	18.19	19.88	4.19	2.0	2.19
22. 3 children	5.54	28.90	16.61	12.29	5.22	3.0	2.22
23. 4 & more	5.21	36.62	24.56	12.06	7.02	4.71	2.31
24. Total or average	50.02	181.80	68.90	112.90	3.63	1.38	2.26

Notes:

The totals may not check because of rounding.

Lines 1-5: Calculated from the data in the Census 1970 source cited for Panel A of Table 1 (Tables 3 and 7).

Lines 6-24: Calculated from Source I, used extensively for Table 1. The data are from Table 19, pp. 43ff.

the number of children per family. Thus the Census data in lines 1-4 show a variation in the number of adults per family between 2.14 and 2.27, while the number of children per family varies from 0 to 3.2; and the number of adults per family declines slightly as the number of children per family increases. The Current Population Reports data, the ones that also provide information on income, show for the husband-wife families, the dominant type-of-family group, a variation in the number of adults per family only from 2.28 to 2.38--while the number of children per family varies from 0 to 5.47; and there is relative stability in the adults per family averages, with no evidence of any correlation with numbers of children per family (see line 6-11, columns 7 and 6). In one other sizable type-of-family group, that with female heads (indicating the absence of husband), the average number of adults per family is largest in the family with no children (see line 13, col. 7)--and that number is well below 2 in female head families with one or more children. The combination of husband-wife and female head families, which, for March 1970, accounts for 50 out of some 51.3 million families, yields an average of adults per family that is relatively constant, while the number of chidren per family rises from 0 to 4.7 (see lines 19-23, cols. 7 and 6).

We may now consider the reasons for the findings in Tables 1 and 2 relating to the movement in the number of adults per family: quite moderate rise as we classify families by increasing number of persons; and, somewhat of a surprise, no rise but a rough constancy in the number of adults per family as we classify families by increasing number of children per family. At first glance, the reasons are statistical;

but they imply a number of substantive factors.

The statistical reason is that a family is defined so that it must have a minimum of 2 persons. If the satisfaction of this minimum in the case of 2 person families involves as large a number of adults per 2 person familiy as 1.94 (see Table 1, line 1, col. 4), and the proportion of 2 person families in all families is as high as 34.4 percent (see Table 1, line 1, col. 1), then, given an average of adults per family for all families of only 2.26, the possible rise in the number of adults per family in the more than 2 person classes is quite limited. The average of adults per family in families with more than 2 persons will, therefore be no higher than /(100.0 x 2.26) minus (34.4 x 1.94)/: 65.6, or 2.43. Given the admixture of female head families among those in the 3,4, or even 5 person classes, the limited progression now shows in Table 1, column 4, in adults per family, is almost inevitable. Likewise, in the case of the classes by number of children, it will be noted that in Table 2 the proportion of families with no children is as high as 21.66/51.15, or 42.3 percent (see line 1 and 5, col. 1); while the average number of adults per family with no children is well in excess of 2 (in fact 2.27, see line 1, col. 7), while the over-all average of adults per family is somewhat lower, at 2.21 (see line 5, col. 7). The results that we obtain in Tables 1 and 2 for the movement of adults per family with rising number of persons or children per family, are largely pre-determined by the definition of family, with a minimal number of 2 persons, and the very low average number of adults per family, low in being close to the 2

person minimum. The results, the range in the number of adults per family, might have been quite different if we either defined families with a lower minimum, say 1 person; or raised the number of adults per family, either by lowering the age of separation between children and adults (e.g. at below 15 rather than below 18) or by assuming, with given number of children per family, a larger average number of adults per family unit.

It is clear that the definitions with which we operate--of a family unit, of children versus adults--while contributing to the results obtained in Table 1 and to be obtained in Table 3, have substantive implications and raise substantive questions. Can we assume that the population of what the Bureau of the Census calls "unrelated individuals," persons outside of institutions but living outside their own families, either alone or with non-relatives, are not tied by community of interest to their families and should not be included with the latter? In defining families not only by blood and other ties, but also by identity of residence, can we assume that there are no significant economic ties among families related by blood or marriage, but living in different locations (perhaps on the same street)? And if we deal with societies at different levels of economic and social development, can we assume that the division line of under 18 and 18 and over between children and adults can be applied in all countries; and possibly among various economic and social groups within the same country? These questions as to the substantive implications of our definitions are noted here and some will recur in later discussion, but they cannot be answered adequately. Still, awareness of them

is useful if only to induce probing the substantive significance of the statistical results.

If we set aside the effects of including the "unrelated individuals," to be illustrated directly below, and assume that the families as defined in the tables here for the United States represent units largely independent of each other in their decisions on securing and spending of income, the results in Table 2 do carry a major significant finding. It is to the effect that in 1970, and probably in other years, families differed widely in the number of children, while the number of associated adults was about the same--whether the family had no children, or had as many as 4 or well over. And the groups of families involved in such a disparate combination of children and adults, with such different "dependency" ratios, were quite large. Thus for the combination of husband-wife and female head families, families with 4 or more children numbered over 5 million, and the children in them, 24.6 million, were over a third of all children (see lines 23 and 24).

This finding carries two implications. The first is that the cross-section distribution of families by number of children of the type shown in lines 19-23, column 1 of Table 2, for the combined total of husband-wife and female head families, is not compatible with the assumption that almost all families have, over time, the same number of children over the life cycle span of the family. In other words, the implication is of substantial differences among families in the number of children, even when cumulated over the <u>lifetime</u> of the family (including or excluding

the few years of separate life of the future adult members of the family, past childhood, terminable at age 18, and before forming the family unit). This important implication of the cross-section for the long-term characteristics of the family unit and its child-and adult members in the movement over time, will be treated in a later section of this paper.

The second implication was already suggested in our discussion of Table 1. If the number of adults, the major source of income of the family, barely changes with increase in the number of children and hence in the size of the family, one should expect that income per family, in the distribution by the number of children, would show even a milder rise as we move toward the classes with larger number of children per family. Hence, the TDM or Gini coefficient for the disparity F-Y would be smaller than that we found for the distribution by number of persons in Table 1. Conversely, the resulting disparity in family income per capita, the TDM or Gini for the disparity in family income per capita, the TDM or Gini for the disparity F-Y, would be larger than in Table 1.

This is what we find in Table 3, which parallels Table 1, with the major difference that now the distribution is among families by number of children rather than by the number of persons.

Comparing first the movements of per family income in Panel B of Tables 1 and 3, we find that the rise in the latter table from about $10 thousand for families with no children to $11.2 thousand for families with 3 children, is, at about 12 percent, much milder than the rise from $8.8 thousand for family of 2 persons to $12.2 thousands for families 5 and 6 persons. Conversely, the decline in per family income in Table 3 from

Table 3 Children and Adults, Distribution of Families by Number of Related Children under 18, United States, 1969-70

A. Shares of Families (F), Persons (P), Children (Pc), and Adults (Pa), Families Grouped by Number of Children per Family

Groups by number of children	Numbers, in Million				% in Relevant Totals				% in P	
	F	Pc	Pa	P	F	P	Pc	Pa	Pc	Pa
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. No children	21.42	0	48.34	48.34	41.8	26.1	0	41.8	0	26.1
2. 1 child	9.76	9.76	22.01	31.77	19.0	17.1	13.9	19.0	5.2	11.9
3. 2 children	9.20	18.41	20.77	39.18	18.0	21.1	26.4	18.0	9.9	11.2
4. 3 children	5.58	16.75	12.60	29.35	10.9	15.8	24.0	10.9	9.0	6.8
5. 4 children	2.85	11.39	6.43	17.82	5.6	9.7	16.4	5.6	6.2	3.5
6. 5 children	1.29	6.43	2.90	9.33	2.5	5.0	9.2	2.5	3.5	1.5
7. 6 & over	1.14	7.05	2.56	9.61	2.2	5.2	10.1	2.2	3.8	1.4
8. Totals and averages	51.24	69.79	115.61	185.40	10.00	3.62	1.36	2.26	37.6	62.4

B. Money Income (Y) per person, All Persons, Children, and Adults

	Y/P $	Y/P $	Y/P multiplied by proportion in P of:			% in total Y/P of:		
			P	Pc	Pa	Col. 3	Col. 4	Col. 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
9. No children	10,073	4,464	1,165	0	1,165	39.8	0	39.8
10. 1 child	10,752	3,302	565	172	393	19.3	5.9	13.4
11. 2 children	11.145	2,618	552	259	293	18.9	8.9	13.4
12. 3 children	11,242	2,139	338	193	145	11.6	6.6	5.0
13. 4 children	11.067	1,769	172	110	62	5.9	3.8	2.1
14. 5 children	10,267	1.415	71	50	21	2.4	1.7	0.7
15. 6 & over	9,806	1,158	60	44	16	2.1	1.5	0.6
16. Totals and average	10,577	2,923	2,923	828	2,095	100.0	28.4	71.6

Table 3--continued

C. Measures of Disparity Among:

		Families by number of persons (F-P) (1)	Families by number of children (F-Pc) (2)	Families by number of adults (F-Pa) (3)	Col. 2 X proportion of Pc (4)	Col. 3 X proportion of Pa (5)	Families by Y/F (F-Y) (6)	Persons by Y/P (P-Y) (7)
17.	TDMs	35.2	93.8	0	35.3	0	4.4	31.8
18.	Ginis	0.224	0.596	0	0.224	0	0.025	0.207

D. Derivation of Income Disparity among Three Groups:

Children (Pc): Adults with Children (Pca):

Adults without Children (Paa)

		% in total P (1)	% in total Y (2)	Difference (3)	Per Person Income Relative (4)	Per Person Income ($) (5)
19.	Pc	37.6	28.4	-9.2	0.755	2,207
20.	Pca	36.3	31.8	-4.5	0.876	2,561
21.	Paa	28.1	39.8	13.7	1.525	4,458
22.	Total, TDM, average	100.0	100.0	27.4	1.000	2,923

Notes

The basic data in Panel A, column 1, the totals of children, all persons, and hence adults (line 8, columns 2-4), and the average income per family, in lines 10-17, col. 1 of Panel B, are all taken directly from Source I, Table 19 (see notes to Tables 1 and 2 above). The entries in column 2, lines 1-7, were then calculated by multiplying the numbers of families by children per family (including the top open end class of over 6 children, which worked out to average 6.21).

The estimate of the number of adults in the groups distinguished in the vertical stub, was based on the assumption that the average number of adults per family was the same in each number-of-children class. The rough average was 2.26, but in our calculations we used the more detailed figure of 2.2564.

Table 3--continued

Notes--continued

The data, combined with the assumption, permitted all the calculations, the results of which are summarized in Table 3.

Line 8:

The entries are: columns 1-4--totals of families, children, adults and all persons within families, in million; columns 6-8--average number per family, all persons, children, adults.

Panel B, column 2:

Calculated by dividing the income per family by the number of persons per family in the classes in the vertical stub. This number per family equals the changing number of children plus a constant average of adult persons family in the successive children per family classes.

Line 16:

Entries in columns 1 and 2 are the countrywide averages of money income per family and per person. Those in columns 3-5 are the sums of entries in the corresponding columns, line 9-15; and so are the entries in columns 6-8.

Panel C:

See comments on Panel C in Table 1.

Panel D:

See comments on Panel D in Table 1. The entry in line 22, column 3 is the TDM, measuring the per person income disparity among the three broad groups distinguished. It should be compared with the TDM (P-Y) in line 17, column 7.

$11.2 thousand for families with 3 children to $9.8 thousand for families with 6 and over children is more marked than the drop in Table 1 from $12.2 thousands for families with 5 or 6 persons to 11.5 for families with 7 and over persons.

Because of this milder rise (and sharper decrease) in income per family in Panel B of Table 3 than in Table 1, the disparity between families and income, F-Y is appreciably lower in Table 3: the relevant TDM and Gini are 4.4 and 0.025 respectively, compared with 11.6 and 0.074 in Table 1. However, the disparities in the distribution of income per person, for classes of families and persons by number of children, are wider in Table 3, reflecting more fully the effects of the presence and unequal distribution of the number of children. The relevant measures, for P-Y, are a TDM and Gini in Table 3 of 31.8 and 0.207, compared with 26.8 and 0.175 in Table 1. Thus, despite the lowering of the spread of size differences in the distribution of families by number of persons in Table 3, measured by a TDM of 25.2 and a Gini coefficient of 0.224 (compared with 38.0 and 0.248 in Table 1), the fuller reflection of the effects of differences in number of children, results in a P-Y disparity, reflecting only differences in number of children and allowing for no variation in number of adults, that is substantially greater than the P-Y disparity revealed by the distribution of families by number of persons in Table 1.

To put it briefly: if we allow for the effect of differing numbers of children on the per person income of families, the P-Y disparity thus contributed to the total distribution of income is measured by a TDM of 31.8 and a Gini coefficient of 0.207. The total disparity in the

distribution of household income per person in the total population within familes for United States in that year is approximated by a TDM of 53.8 and a Gini coefficient for 0.371.[6] While the measures are not directly additive, it is difficult to avoid the conclusion that the unequal distribution of children is a major contributor to inequality in the distribution of household income per person among the population.

This conclusion is clear also in the comparison of Panel D in Table 3 with that in Table 1. This panel derives income disparities among three groups of persons: children; adults in families with children; and adults in families without children. In Panel D of Table 1, the average incomes of these three large subgroups of the total population within families were $2,402, $2,750, and $4,392 respectively, and the TDM (P-Y) for the three groups was 18.6. In Panel D of Table 3, the average income for the children and for adults in families with children are $2,207 and $2,561, about 10 percent lower than in Table 1; while the average income for adults in families without children in Table 3, at $4,458, is about 3 percent higher. The TDM (P-Y) for the three large groups is as high as 27.4 in Table 3; and there is a more marked excess of the income per person for adults within families with children, than for the children in the same families.

It was already noted that the substantive meaning of our findings depends upon the validity of the assumptions implicit in the definition of units such as families or households and in the lines of distinction between children and adults--assumptions as to the relative independence of families from each other in securing and disposing of income, and as to the nature

of children as pure dependents and of adults as income providers. Before shifting to the next section, one should add that a similar argument is applicable to our use of money income as it is defined in our data. According to this definition (see Source I, p. 6) money income includes receipts, before taxes, of wages, salaries and related payments, net income from self-employment, farm and nonfarm; a variety of property incomes, such as dividends, interest, net rent, royalties; and a variety of transfers, including "regular contributions from persons not living in the households." If different definitions of income were to have been used, whether expanded to include both income in kind and services of family members within the family, whether extended over periods longer than a year to reduce transitory components, whether adjusted for differences in purchasing power of the money incomes among various socio-economic groups, the results would most likely be different magnitudes of per person income disparities between children and adults. But the recognition of these, possibly preferable, but more difficult alternatives, should not bar the attempt to explore the more narrowly defined available data, so long as we recognize their limitations.

3. Inclusion of Unrelated Individuals

We have dealt so far with families, groups of at least two persons, each group with two defining characteristics: all members are related by blood, marriage, or adoption ties; all members live together in the same housing unit.[7] The total of families, so defined, falls short of what might be called household population (i.e., population outside of institutions, such as jails, barracks, et); and we should now account for the omission.

The difference between the population in families and that in households, a household consisting of all persons, related and unrelated, who occupy the same housing unit, is accounted for by unrelated individuals, defined (again in Source I, p. 9) as "persons 14 years old and over (other than inmates of institutions)who are not living with any relatives." Source I shows that for March 1970, the population of unrelated individuals amounted to 14.45 million persons (see Table 17, p. 35), which added to 185.40 million persons in families (see Table 18, p. 42), yields a total of 199.85 million persons. This can be compared with the total number of persons in households of 199.38 million (see CPR, Series P-60, no. 72, August 1970, Table 5, p. 15, referred to henceforth as Source II).

To complete describing the relation between families and unrelated individuals, on the one hand, and households, on the other, we must introduce the distinction, within families, between primary and secondary families, and that within unrelated individual between primary and secondary individuals. A primary family is one the head of which is the head of the household, whereas a secondary family is one that lives in the housing quarters of the primary family to which it is not related (e.g., husband and wife who are lodgers in the housing unit inhabited by a primary family, with no blood, marriage, or adoption ties between the two families). Source I indicates that out of the total of 51,237 thousand families in March 1970, as many as 51,110 thousands were primary families (for the latter figure see Table 39, p. 83), thus leaving a residual of only 127

thousands of secondary families. The latter, by the way, were characterized by a much lower income per family than was true of the primary families.

A primary individual is one who lives in a household, either alone or with other primary individuals to whom he is not related. A secondary individual is a "person, such as a lodger, guest, or resident employee, who is not related to any other person in the household..(Source I, p. 9). Source I shows that for March 1970, of the 14.45 million unrelated individuals, 11.76 million were primary individuals and 2.69 million were secondary individuals. The sum of primary families cited above, of 51.11 million and of primary unrelated individuals of 11.76 million yield a total that should equal that of all households, the latter being in fact 62.87 million (see Source II, Table 5, p. 15). It should be noted, however, that the total of primary unrelated individuals, at 11.76 million is larger than the number of one-person households, at 10.69 million. The discrepancy is accounted for by the primary unrelated individuals who form households of more than one person; in Table 1 of Source II (p. 11) we find over a million households of 2, 3, and 4 persons, the members unrelated to each other.

In Table 4 we add all unrelated individuals, viewed as adults to the population in families as classified by the number of related children under 18. Before we comment on the effects of this extension of the covered population on inequality in per person income generated by differences in number of children per family, some relevant characteristics of the population of unrelated individuals should be noted.

Table 4

Children and Adults, Table 3 Supplemented by Inclusion of Unrelated Individuals (U)

A. Shares of Families (F) and Unrelated Individuals (U), Persons (P), Children (Pc), Adults (Pa), Groups by Number of Children per Family (F)

Groups	% in relevant totals F,U (1)	P (2)	Pa (3)	% in P Pc (4)	Pa (5)
1a. U	22.0	7.2	11.1	0	7.2
1b. F, no children	32.6	24.2	37.2	0	24.2
2. F, 1 child	14.9	15.9	16.9	4.9	11.0
3. F, 2 children	14.0	19.6	16.0	9.2	10.4
4. F, 3 children	8.5	14.7	9.7	8.4	5.3
5. F, 4 children	4.3	8.9	4.9	5.7	3.2
6. F, 5 children	2.0	4.7	2.2	3.2	1.5
7. F, 6+ children	1.7	4.8	2.0	3.5	1.3
8. Totals	65.69	199.85	130.06	34.9	65.1

B. Money Income per Person, All Persons, Children, and Adults

	Y/P $ (1)	Y/P multiplied by proportion in P of: P (2)	Pc (3)	Pa (4)	% in total Y/P of: Col. 2 (5)	Col. 3 (6)	Col. 4 (7)
9a. U	4,248	306	0	306	10.1	0	10.1
9b. F, no children	4,464	1,080	0	1,080	35.8	0	35.8
10. F, 1 child	3,302	525	162	363	17.4	5.4	12.0
11. F, 2 children	2,618	513	241	272	17.0	8.0	9.0
12. F, 3 children	2,139	314	179	135	10.4	5.9	4.5
13. F, 4 children	1,769	157	101	56	5.2	3.3	1.9
14. F, 5 children	1,415	67	46	21	2.2	1.5	0.7
15. F, 6+ children	1,158	56	41	15	1.9	1.4	0.5
16. Totals and averages	3,018	3,018	770	2,248	100.0	25.5	74.5

Table 4--continued

C. Measures of Disparity Among:

	FU by number of persons (FU-P) (1)	FU by number of children (FU-Pc) (2)	FU by number of adults (FU-Pa) (3)	Col. 2X proportion of Pc (4)	Col. 3X proportion of Pa (5)	FU by Y/FU (6)	Persons by Y/P (7)
17. TDMs	46.6	111.2	21.8	38.8	14.3	23.8	32.0

D. Derivation of Income Disparities among Three Groups: Children (Pc); Adults with Children (Pca); and Adults without Children (Paa)

	% in P (1)	% in Y (2)	Difference (3)	Per Person Income Relative (4)	Per Person Income ($) (5)
18. Pc	34.9	25.5	-9.4	0.731	2,206
19. Pca	33.7	28.6	-5.1	0.849	2,562
20. Paa	31.4	45.9	14.5	1.462	4,412
21. Total, TDM, average	100.0	100.0	29.0	1.000	3,018

Notes

All the data, except those relating to number and average money income of unrelated individuals, are from Table 3; and hence from Source I which provides the bases for Tables 3 and 1.

The data on unrelated individuals are from the same source, Table 17, p. 35.

Unrelated individuals are "persons 14 years old and over (other than inmates of institutions) who are not living with any relatives. An unrelated individual may constitute a one-person household by himself, or he may be part of a household including one or more families or unrelated individuals, or he may reside in group quarters such as a rooming house." (See p. 9 of the source.) Female, as well as male, unrelated individuals are referred to in the sentence just quoted.

Our calculation assumes that all unrelated individuals are 18 years of age and over, i.e. adults in the sense the term is used here. This is

Table 4--continued

Notes--continued

not correct, since the definition above allows for unrelated individuals down to 14 years of age; but it was impossible to allocate the younger individuals among the number-of-children classes. The error, however, is quite small, as the comparison of the number of children in Tables 3 and 4, 69.79 million (which do not include any unrelated individuals) with that in the data on households (Source II, Table 15) of 70.19 million (which include the younger unrelated individuals). The difference is 0.4 million, out of a total of 14.45 million.

Panel A:

The number of children and their distribution among children-per-family classes remains as given in Table 3 (see column 2, lines 1-8). The U units are, by definition, without children.

The entries in line are, in millions: total number of families and unrelated individuals (col. 1): total persons in the population of families and unrelated individuals (col. 2); total of adult persons in that population (col. 3).

Panels B-D:

See notes to these panels in Tables 1 and 3 above. The TDM in line 21, column 3 is to be compared with that in line 17, column 7.

Of the 14.45 million of unrelated individuals, 5.44 million or 37.6%, were male and 9.01 million or 62.4%, were female. But this dominance of females was due to the greater number of unrelated females in the advanced ages. Unrelated individuals aged under 55 years, accounted for only 6.10 million, of whom 3.21 million were male and 2.89 million female. But unrelated individuals 55 years old or older added up to 8.35 million, of whom 3.23 were male and as many as 6.12 million were female. This preponderance of females concentrated in the older ages was due in part to the survival of females to older age than of related males (their husbands). But that the surviving widows should have, in the United States, formed independent households with a single person in each, must have been due to distinctive institutional patterns of family structure, patterns that have not prevailed in the United States in the earlier past; nor are observed in the economically less developed countries in recent years.

Given the dominance among unrelated individuals of the more advanced age groups of 55 and over, and particularly of older women, it is somewhat of a surprise to find that the per person income of all unrelated individuals, at $4.25 thousand, is only slightly below the per person income of families with no children ($4.46) and greatly in excess of the per person income of all other families, with one or more children (see Table 4, Panel V, col. 1). It may be that among the older men and women only those who can afford it establish separate households rather than remain members of a related younger family--so that only older men and women with higher than average per person income enter the group reported in line 9_a of Table 4.

Comparing Table 4 with Table 3, we find that the inclusion of unrelated individuals results in a wider inequality in the distribution of the units (families and unrelated individuals, or FU) by numbers of adults, and hence also by the number of persons. Thus, the relevant TDMs between F and P in Table 3 were 35.2 for F-P, 35.3 for (F-Pc) weighted, and 0 for (F-Pa) weighted, whereas in Table 4 the comparable TDMs become 46.4 for FU-P, 36.6 for (FU-Pc) weighted, and 14.3 for (FU-Pa) weighted (see line 17 in both tables). Also, the inequality in income per unit in Table 4 is appreciably wider than that in income per family in Table 3, the relevant TDMs being 23.8, for FU-Y and only 4.4 for F-Y (line 17, both tables).

By contrast, the effects of inclusion of unrelated individuals on income disparities in per person income, of most interest to us as a measure of contribution to the more meaningful overall distribution of income among the population by income per capita, are quite small. The TDM for P-Y in Table 4, at 32.0, is barely above that in Table 3, at 31.8 (line 17, both tables). The TDMs for income disparities among the three major population groups in Panel D of Tables 3 and 4 show a somewhat greater rise, from 27.4 to 29.0; but even so the rise is moderate. The limited range of these effects, as compared with those on inequality in size of units and disparities in total income per unit, is due to the fact that the weight of unrelated individuals in total persons, at 7.2 percent, is so much smaller than their weight in total of all units, at over 22 percent; and that per person income of unrelated individuals, at $4,248, is not that much higher than the per

person income of all adults in families (which could be computed from Panel D of Table 3 at $3,250 per adult).

We may conclude this comparison by suggesting that the effects just described would be found, on a somewhat reduced scale, were we to draw a similar comparison between households of 2 persons and over (analogous to all families in Table 3) and all households including 1 person units (analogous to Table 4)--both sets classified by the number of children in the household. Here also, the effects on the distribution by total income per household, so widely used, would be quite substantial--the more so, the larger the proportion of 1 person households in the total. Yet the more significant comparison of income on a per person basis would show only minor differences associated with the inclusion of 1 person units.

4. The Life Cycle Aspects

The central question here bears on the relation of disparities in the distribution and per person income between children and adults, of the type shown in Tables 2,3, and 4, to the life cycle of the family. It was suggested, in the comments above on Table 2, that the distribution of families by the number of related children, shown in that table (and in Table 3), is not compatible with the assumption that all families have a roughly similar pattern of children over the family's life cycle, similar with respect to numbers of children if not fully in respect to their timing within the life span. Were such an assumption valid, it would have meant that for the cumulative numbers and per capita income over the full life span of the family unit, there would be no substantial differences among families

in the average number of children and in the per person income among children and adults; and, therefore, no transferable differentials in lifetime income from one generation to the next--arising out of this particular demographic factor. We return to this question here; and, in order to simplify matters, discuss it in application to families. The inclusion of unrelated individuals, while affecting the parameters slightly, would not modify the reasoning.

The lack of validity of the assumption could be demonstrated in two ways. In the first, we view the families as continuous units within the assumed life span--from, say, formation at age of head 22, beginning of year, to dissolution at the end of age of head 70, a span of 49 years. We are thus neglecting the limited dissolution with the life span, which can be produced by premature death or by divorce. If so, a family with say 6 children, could have reached that status only by a succession of preceding births within that family (neglecting shift of related children into the family from elsewhere). And, given the short childbearing life span, the span of the antecedent births should have been limited enough to allow for subsequent reduction in the number of children as they attain the dividing age line of 18 years, well before the dissolution of the family assumed to occur at age of head 70.

With such continuity in the life span of a given family, and limited differences in the timing patterns, the assumption that each family has the same number of total children would imply that the cross-section distribution of families by number of related children under 18 present

varies from 0 to the largest number of children, the latter the same for all families. To illustrate: let us assume that a cohort of families, all formed at age of head 22, would have the 1st child at 23 and then proceed to have a maximum of 3 children, spaced at 6 year intervals (so that the last of the three would be born at age of head 25, and "leave" the family at age of head 51, end of year). Keeping the assumption of continuity to exclude deaths within the span considered (under 18 for children, and under 71 for adults), and distributing the family-years among years with differing numbers of children in the family, we would find that, for each family, out of the total of 49 family-years, 19 were with 0 children, 12 each were with 1 and 2 children respectively, and 6 were with 3 children, and none were with more than 3 children. One should note that in this illustration, the average number of children per family-year is as high as 1.10, within range of the average of 1.36 per family found in Table 3.[8]

This argument implies that in an over-all distribution of families and children by the age-of-head classes, the averaging that takes place is not of families with roughly the same number of children ever born (and, by the conditions of the argument, all assumed to survive, at least until they pass the dividing age of 18)--but of families with widely different numbers of children-ever-born. By reference to Table 3, Panel A, we find a range not from 0 to 3 children indicated in the illustration in the preceding paragraph, but one from 0 to over 6. This means that

even when cumulated over the total life span of a family, about fifty years, the average number of children per family, and hence the average per person income of children and of associated adults, would differ substantially.

In this connection, we should note the actual distribution of the same population of families for the United States for March 1970 that we covered in the earlier tables, but this time the distribution of persons, children, and adults is for classes of families by age of head (Table 5). The table parallels Table 3 and should be compared with the latter.

One important aspect of the comparison is the sharp reduction in the inequality in the distribution of families by number of children--from a TDI for families and children (F-Pc) of 93.8 in Table 3 (line 9) to 56.0 in Table 5 (line 9). And such a reduction could have been expected from observing that the range in children per family in Table 5 is from 0.15 to 2.54, compared with that from 0 to well over 6 in Table 3. And whereas the range of the number of children per family in Table 5 could easily have been duplicated by assuming all families had about 3 children within the life span, the juxtaposition of the two tables completes the judgment that the averaging for Table 5 was of families with widely divergent numbers of children ever born--which, given the assumption of continuity in family units over their life span, yields the conclusion that numbers of children per family must have differed widely even when cumulated over the total span from formation to dissolution.

Table 5

Children and Adults, Distribution of Families by Age of Head, United States, 1969-70

A. Shares of Families (F), Persons (P), Children (Pc), and Adults (Pa), Families Grouped by Age of Head

Age-of Head Classes	% in F	P/F	Pc/F	Pa/F	% Share in Rel. Totals			% in P	
					P	Pc	Pa	Pc	Pa
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. 14-24	6.9	2.85	0.92	1.93	5.4	4.8	5.9	1.8	3.6
2. 25-34	20.7	3.96	2.01	1.95	22.7	30.4	18.0	11.5	11.2
3. 35-44	21.3	4.72	2.54	2.18	27.7	29.6	20.5	14.9	12.8
4. 45-54	21.1	3.79	1.23	2.56	22.2	19.1	24.0	7.2	15.0
5. 55-64	16.2	2.84	0.39	2.45	12.7	4.6	17.6	1.7	11.0
6. 65 & over	13.8	2.44	0.15	2.29	9.3	1.5	14.0	0.5	8.8
7. Totals & averages	51.24	3.62	1.36	2.26	185.40	69.79	115.61	37.6	62.4

B. Money Income (Y) per Person, All Persons, Children, and Adults

	Y/F $	Y/P $	Y/P multiplied by proportion in P of:			% in total Y/P of:		
			P	Pc	Pa	col. 3	col. 4	col.5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
8. 14-24	6,842	2,401	130	43	87	4.4	1.4	3.0
9. 25-34	9,942	2,511	570	289	281	191.5	9.9	9.6
10. 35-44	11,974	2,537	703	378	325	24.0	12.9	11.1
11. 45-54	12,933	3,412	757	245	512	25.9	8.4	17.5
12. 55-64	11,353	3,998	508	68	440	17.4	2.3	15.1
13. 65 & over	6,722	2,755	256	14	242	8.8	0.5	8.3
14. Totals and averages	10,577	2,923	2,924	1,037	1.887	100.0	35.4	64.6

Table 5--continued

C. Measures of Disparity Among:

		F by number of persons (F-P)	F by number of children (F-Pc)	F by number of adults (F-Pa)	Col. 2X proportion of Pc	Col. 3X proportion of Pa	F by Y/F (F-Y)	Persons by Y/P (P-Y)
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
15.	TDMs	19.0	56.0	9.0	21.1	5.6	17.4	16.8

D. Derivation of Income Disparity among Three Groups:

Children (Pc); Adults in Families with Children (Pca):

Adults in Families with No (or Few) Children (Paa)

		% in P	% in Y	Difference	Per Person Income Relative	Per Person Income ($)
		(1)	(2)	(3)	(4)	(5)
16.	Pc	37.6	35.4	-2.2	0.941	2,753
17.	Pca	42.6	41.2	-1.4	0.967	2,828
18.	Paa	19.8	23.4	3.6	1.182	3,456
19.	Totals, TDM, averages	100.0	100.0	7.2 (Pcca-Y)	1.000	2,924

Notes

The basic data on number of families, and money income per family by age of head are from Source I, Table 17, pp. 35ff.

The numbers of persons, children, and adults, per family in the age of head classes were estimated from the numbers of persons, children, and adults,per household for classes of households by age of head (See Source II, p. 15, the data omitting the 1-person households). A slight adjustment was required to bring the totals of children and adults to those established for families in Table 3 (or Table 1). But comparison of Panel A here with Panel A in Table 6 below, which shows the data of children and adults per household for households of 2 persons or more, reveals the closeness of the two sets of ratios.

For explanation of entries in lines 7, 14, and 15 see the notes on comparable lines in Tables 1 and 3. For Panel D, the 55-64 and 65 & over age classes were taken to represent adults in families almost without children (Paa).

With disparities in the distribution of children among family classes by age of head so much narrower than in the distribution by classes by number of children, one would expect the disparities in the distribution of all persons among age-of-head classes in Table 5 to be narrower than that of all persons among number of children classes in Table 3. Indeed, the comparable TDMs are 19.8 in Table 5 and 35.2 in Table 3, although one should note that the measure in Table 3 is reduced by some negative association between children per family and adults per family for the six age of head classes (see columns 3 and 4, Panel A of Table 5). Likewise, the associated disparities in average income per person between children and adults are appreciably narrower in Table 5, with TDM (P-Y) being 16.8 and TDM (Pcca-Y) being 7.2 (see lines 15 and 19), compared with 31.8 and 27.4 respectively in Table 3 (see lines 17 and 22). But here again the comparison is complicated by the presence in Table 5 of the life-cycle component of income in its full strength, combined with the negative correlation between the movements of children per family and adults per family. There is no need here to try to deal with these elements of incomparability. It would suffice to emphasize the conclusion as to the reduction in disparity in the distribution of children per family, first noted, and move to the second way of disproving the assumption advanced at the start of this section.

This second way is by use of data that would permit us to observe differences in the distribution of families by number of children and the disparities in average income per person between children and adults,

within separate age-of-head classes. Were all families to follow a roughly similar pattern of having children, similar in number and in timing within the total lifespan, the distribution of families by number of children within the separate age-of-head classes and particularly within the major age classes, would show only minor differences; and so would yield only minor differences in the average per person income between children and adults. If with relevant data, we find, within the major age-of-head classes, substantial differences in children per family and resulting major differences in per person income between children and adults, the initial hypothesis would have to be rejected;and we would conclude that, even with cumulation of numbers and incomes over the full lifespan of a family, substantial differences in average numbers per family and substantial disparities in per person income would remain.

Some relevant data are available; but since they are not focused sharply on the question here, we have to arrange them to suit our purposes. The following comments on Table 6, which summarizesthe data, are intended to explain the procedure followed.

In Panel A we observe the disparities among households of 2 and over in size of households by number of persons, within each of the six age-of-head classes. One would have wished an even more detailed age-of-head classification, but none is at hand. We calculated, for each of the six age classes, a TDM for H-P, i.e., for inequality in the distribution of households by size (col. 4); and the same measure for the total distribution of households over 2 by size (col. 4, line 7). The result is that, compared with a TDM of 38.4 for the over-all distribution, the TDMs within

Table 6

Size of Household and Income per Person Disparities Between Families with and without Own Children, within Age-of-Head Classes, United States, 1969-70

A. Size Disparities, Households of 2 or more, Within Age-of-Head Classes, March 1970

Age of Head Classes	% of HHs (1)	Persons per HH (2)	% of Pers. (3)	TDM H-P (4)	TDM weighted by H (5)	TDM weighted by P (6)
1. Below 25	7.2	2.85	5.7	27.2	1.96	1.55
2. 25-34	20.6	3.97	22.7	27.6	5.69	6.27
3. 35-44	21.1	4.73	27.5	30.4	6.41	8.36
4. 45-54	20.9	3.79	22.0	35.6	7.44	7.83
5. 55-64	16.2	2.84	12.7	34.4	5.57	4.37
6. 65 & over	14.0	2.44	9.4	27.6	3.86	2.59
7. Totals, average, TDM, 6 Classes	52.18	3.62	188.69	38.4	30.9	31.0
8. Line 7, 4 classes	52.18	3.62	188.69	38.4	32.7	32.7

B. Disparities in Income per Person, Families without own Children (Faa) and Families with own Children (Fcca), within Four Age-of-Head Classes, U.S., 1969-70

	Age of Head Classes				Total
	Below 25 (1)	25-44 (2)	45-64 (3)	65& over (4)	(5)
9. Faa, million	1.41	2.93	11.34	6.88	22.57
10. Fcca, million	2.11	18.56	7.80	0.20	28.67
11. All F, mill.	3.52	21.49	19.14	7.08	51.24
12. Money income (Y) per. Faa, $000	7.59	11.64	11.90	6.70	10.01
13. Money income (Y) per Fcca, $000	6.34	10.87	12.75	7.30	11.02
14. Total Income of Faa, $ bill.	10.75	34.11	135.00	46.10	225.96
15. Total income of Fcaa $ bill.	11.36	201.68	99.44	1.48	315.96
16. Total Y, $ bill.	24.11	235.79	234.44	47.58	541.92

Table 6--continued

Panel B--continued

	Age of Head Classes				Total
	Below 25	25-44	45-64	65 & over	
	(1)	(2)	(3)	(4)	(5)
17. Adults (Pa) per family	1.95	2.08	2.50	2.29	3.35
18. Adults in Faa, mill.	2.75	6.10	28.34	15.76	52.95
19. Own children (Pc) per family	0.91	2.24	0.85	0.15	1.34
20. Total children, mill.	3.20	48.06	16.35	1.03	68.65
21. Adults in families with own children, mill.	4.10	38.61	19.50	0.46	62.67
22. Children and adults in families with children, mill.	7.30	86.67	35.85	1.50	131.32
23. All persons, line 18 and line 22, mill.	10.06	92.76	64.19	17.26	184.27
% in Y					
24. Y in Faa, lines 14 and 16	44.6	14.5	57.6	97.00	41.7
25. Y in Fcca, lines 15 and 16	55.4	85.5	42.4	3.0	58.3
% in P					
26. P in Faa, lines 18 and 23	27.4	6.6	44.2	91.3	28.7
27. P in Fcca, lines 22 and 23	72.6	93.4	55.8	8.7	71.3
28. TDM, (P-Y)	34.4	15.8	26.8	11.4	26.0
29. P weights, and P weighted TDM	0.055	0.503	0.348	0.094	20.1
30. Y weights, and Y weighted TDM	0.044	0.435	0.433	0.088	21.0

Notes

Panel A: The underlying data are from Bureau of the Census, Current Population Reports, Series P-60, no. 72, August 1980, Table 5, p. 15.

Table 6 --continued

Notes--continued

The entries in line 7 are: cols 1 and 3, total of households of 2 or more, and of the population in them, in millions: in col 3, arithmetic mean of persons per household; in col 4, the TDI for inequality in size of households calculated from cols 1 and 3, lines 1-6: in cols. 5 and 6, the TDIs for the disparity within each of the six age-of-head classes, weighted by shares in HH and in P respectively.

The entries in line 8, cols 5 and 6 are averages of the TDIs within four age-of-head classes (below 25, 25-44, 45-64, and 65 and over), again weighted by shares in H and P respectively.

Panel B

The underlying data are largely from Source I, Table 21, pp/51ff. This table is the source of entries in lines 9-16.

Panel B classifies families by the presence of absence of own children, not of related children referred to in all other tables here. Source I defines own children as "sons and daughters, including stepchildren and adopted children, of the family head," while related children in a family "include own children and all other children in the household who are related to the family head by blood, marriage, or adoption." (p.9). The difference may be seen by comparing the number of families without own children, 22.57 million (this table, line 9, col. 5) with that of families without related children, of 21.42 million (in Table 3, line 1, col. 1). This comparison led us to assume that the total number of own children was smaller than that of related children by the difference between the two totals, viz. 1.15 to 1.16 million.

Table 6--Continued

Notes--continued

The additional data underlying lines 17 and 19 are provided in Source II, used for Panel A here, from which we calculated, for the four age-of-head classes, the averages of adults and children per household (for households of 2 persons and over). These averages were then adjusted so that when applied to the data in lines 9-11, they would yield the totals of own children (from Table 3, minus the difference between own and related children derived in the preceding paragraph) and of adults (the latter as used in Table 3). The minor adjustments needed were applied only to the very large age-of-head classes, 25-44 and 45-64.

With the entries in lines 17 and 19, it was possible to derive all the other entries. Line 18 is the product of lines 9 and 17; line 20 is the product of lines 19 and 11; line 21 is the product if lines 17 and 10. The products and totals will not check precisely, because the original calculations were for figures with three rather than two decimal places.

The TDMs in line 28 are calculated directly from lines 24-27 above, and measure the income disparity in per person income between families without own children and families with own children, for each of the four age-of-head groups and for the total in column 5.

The P weights in line 29 are calculated from line 23; the Y weights in line 30 are calculated from line 16.

the age-of-head classes vary from 27.2 to 35.6. When weighted by shares in either number of households, or number of persons, the weighted TDM for within age-of-head groups, becomes about 31--a reduction from the over-all of about a fifth. If we use only four wider age-classes, the shift from the over-all measure to the intra-age-of head class measures is somewhat narrower, the weighted measure of 32.7 indicating a reduction of about a seventh.

But Panel A bears only upon inequality in distribution of households or families by number of persons. It has only indirect bearing upon inequality in the distribution of families by number of children, and on the associated disparity in income per person. Of more direct relevance are the data summarized in Panel B, data that distinguish families with own children from those without own children, and permit us to establish the numbers and per person income of the two groups, not only for the total population of families but also within four broad age-of-head classes.

As distinct from related children, the group covered in the preceding tables, own children include only the sons and daughters, born to or adopted by, the head of the family--and thus exclude other relations of the head below 18. As indicated in the notes to Table 6, the difference between the totals of own and of related children is not large; out of a total of some 70 million of the latter, perhaps a million and a half are not own, and even a large relative error in the estimate would not affect the results substantially. We can then see whether, within the four age-of-head classes, the expected difference in per person income between the two major groups--families without children and families with

children--persists.

The findings are summarized in lines 24-28, particularly in the TDMs reflecting the inequality in per person income between the two major groups. For all families, regardless of the age of head (col. 5), the TDM is 26.0, which can be compared with a similar measure in Panel D of Table 3 of 27.4 (line 22, col. 3). The small difference is due largely to our using a constant number of adults per family, for all groups by number of children, in Table 3; whereas here we are allowing the per family number of adults in the two major groups to differ, and they do in that the number of adults for all families works out to 2.35 per family, compared with 2.19 per family for the units with own children. (see lines 17 and 21, col. 5). But the difference is small, so that we can view the relation between within age-of-head TDMs and that for the over-all distribution in Table 6 as roughly applying to what we would find for the comparison of families with and without related children in Table 3.

For the four broad age-of-head groups here the TDMs vary from 11.4 to 34.4. But there are only two large groups, 25-44 and 45-64, which together account for over 80 percent of all persons and almost 90 percent of all income. The weighted TDMs between 20 to 21, are about a fifth below the over-all measure, and with more detailed age-of-head breakdown, the reduction might be a third, a weighted average of TDM of about 18. This suggests a substantial disparity in per person income between families with and without children, and hence between children and adults, within age-of-head groups--and hence subject to cumulative differences over the life span of the families.

5. Model Type Families: Analytical Illustrations

Two conclusions are suggested by the data summarized and discussed in the preceding sections. The first is that, for the United States in 1969-70 and most probably other years, cross-section differences among families by number of related children under 18 were wide, were associated with wide disparities in per person income between children and adults, and thus contributed substantially to the inequality in the distribution of family income per person among the population. The second is that these differences among families in the number of related children, and the associated disparities in per person income between children and adults, were observed also within the several age-of-head classes, which indicates that differences among families in number of children and per person income would persist even if we cumulated numbers and incomes over the total life span of the families. A third conclusion, so far partly implicit, is that viewed in the time sequence within the lifespan of the family, a family with large numbers of children would tend to show not only a larger cumulative average number of persons and a lower cumulative per person income, but greater variation over time in the numbers of persons and in the income per person within the life span--a greater rise in persons per family and a greater decline in per person income until the age of head class reaches that with the largest number of children and a greater decline and rise thereafter--than a family with smaller number of children.

In this section, we use model types of families, differing in the number of children (ranging from 1 to 7) they have over the lifespan; and with the help of simplifying assumptions, illustrate the effects of this

difference on the size and per person income of each type of family.

For Table 7 and the data underlying it on the number of children and adults for each year within the lifespan of family of each of the 7 types, the following simplifying assumptions were made, for all types. First, the formation of the family was set at year 22 of head (beginning of year) and the dissolution toward the end at age of head 70 (end of year)--a total family lifespan of 49 years. Second, the first child is born at age of head 23, i.e., a year after formation of family; and other children follow, at time patterns different for the several model types--to be specified below. Third, effects of mortality and of other sources of possible changes in the family within the lifespan indicated above (divorce, separation, and joining) are excluded. Fourth, the average number of adults per family, for all types and all years within the span, is set at 2.26--the average shown in Table 3.

The seven model types of families are defined as follows: I--1 child; II--2 children, spaced 7 years apart; III-3 children, spaced 6 years apart; IV--4 children, spaced 5 years apart; V--5 children, spaced 8 years apart; VI--6 children, spaced 3 years apart; VII--7 children, spaced 2 years apart. The combination of the general assumptions in the paragraph above, and the specific type definitions just presented, permit us to derive for each of the 49 span years, for each model type, the number of children and adults, and total persons for the family-year. This set of detailed data is then summarized, in the fashion presented in Table 7, which parallels the empirical distribution in Panel A of Table 3.

While the assumptions just listed are over-simplified in the sense

Table 7

Distribution of Family-Years (T_f) by Number of Child-Years (T_c), Adult-Years (T_a), and Person-Years (T_p), Life Span of Model Type Families

Number of Children in family-year	Types of Families, Child-Years (T_c) I (1)	II (2)	III (3)	IV (4)	V (5)	VI (6)	VII (7)	Totals, unweighted (% share) (8)
1. no children	31	24	19	16	15	16	19	140 (40.8)
2. 1 child	18	14	12	10	8	6	4	72 (21.0)
3. 2 children	0	11	12	10	8	6	4	51 (14.9)
4. 3 children	0	0	6	10	8	6	4	34 (9.9)
5. 4 children	0	0	0	3	8	6	4	21 (6.1)
6. 5 children	0	0	0	0	2	6	4	12 (3.5)
7. 6 children	0	0	0	0	0	3	4	7 (.02)
8. 7 children	0	0	0	0	0	0	6	6 (.02)
9. 6 & over	0	0	0	0	0	3	10	13 (3.8)
Totals, averages, and disparity measures								
10. Total fam. years T_f	49	49	49	49	49	49	49	343
11. Child-years, T_c	18.00	36.00	54.00	72.00	90.00	108.00	126.00	504.00
12. Adult-years, T_a	110.74	110.74	110.74	110.74	110.74	110.74	110.74	775.18
13. Persons per family-year (T_p/T_f)	2.63	2.99	3.36	3.37	4.10	4.46	4.83	3.73
14. Proportion of child-years in person-years	0.140	0.245	0.328	0.394	0.448	0.514		0.394
15. TDM, T_f-T_p	17.8	24.0	27.0	31.0	34.0	44.4		37.6
16. TDM, T_f-T_c	126.6	98.0	82.2	78.4	76.2	86.6		95.0

Note

For the definitions and assumptions underlying the illustrative exhibit above, see text.

The entries in parentheses in col. 8, lines 1-6, 9 and 10, are the percentage shares of family years with 0, 1, etc. children, in the total of family years in line 10, col. 8.

that our results necessarily fail to reflect several aspects of the variety of experience, they are not so unrealistic as to render these results meaningless. Thus, assuming the same number of adults per family for all types of families, and each year within the family lifespan, means neglecting the differences likely to exist in real life; but we did find in Section 1 for classes of families grouped by numbers of related children under 18, and given the definition of a family as a unit of at least 2 persons, relatively minor differences in numbers of adults per family. Likewise, setting the spacing of children for the several model-types so that the total periods of childbearing and maturing of children to age 18 do not differ greatly among the several model-types, makes for a greater concentration of the characteristic number of children with a narrower range of age of head than is likely to prevail in reality. But, as Table 5 shows, only a small proportion of children in 1970 was within the age brackets of head of 55-64 and 65 & over, years of age. A similar comment can be made on exclusion of intra-span mortality and other sources of variation in size of families, which implies that these disturbances and discontinuities are not so major as to invalidate the simpler picture.

The results in Table 7 indicate that the several model types yield, in the progression of columns from the 1 to the 7 children type, a steady rise in average size of family (by between 0.36 and 0.37 per child, which is the ratio of 18 to 49, see the differences between successive entries in line 13); that this increase is due solely to the assumption of increasingly large number of children, so that the ratio of the latter to total persons per family rises steadily. It also follows that disparity, <u>within</u> the

lifespan of the family, between the persons or children per family in the successive years (quinquennia or decades), also widens as we move from the 1 child to multichildren family--as reflected in the rise of the TDM for family-years to person-years in line 15 of Table 7. Finally, the source of instability over time in the size of the family being due exclusively to instability in the number of children, the TDM for inequality in number of children per family, shown in line 16, will, if weighted by the proportion of child-years in person years in line 14, yield the TDM in line 51. The reason why the latter rises is that the decline in the inequality in distribution of children among the family-years is more than offset by the rise in the proportion of children among persons.

Before passing to the next table, we may note the result of a simple addition for the 7 model types in column 8 of Table 7--addition with equal weights. Though such unweighted addition is hardly realistic in approximating a total distribution of families among the model types, the results are not too different from those found in Table 3. The percentage shares of groups with 0, 1..etc. children, in parentheses in column 8, is similar to that in column 5 of Panel A in Table 3. The total proportion of children years here is 39.4%, compared with 37.6% of children in total persons in Table 3; the TDMs for F-P are 37.6 here and 35.2 in Table 3. Such rough agreement may be due to the fact that the distortion of weights implied in unweighted addition is true for both the <u>low</u> children per unit groups (such as I and II here) and the <u>high</u> children per unit groups (such as V-VII) here--the two sets of distortion almost balancing each other.

In Table 8 we assign to each family type, for each year within its lifespan, a per person income, corresponding to the number of children in that family in that year. These per person incomes are taken from Panel B of Table 3, shown there for each class of families, with 0, 1... and 6 & over children. The procedure makes it possible to calculate per person income for each family type for each year, and then cumulate it into a total over the whole span of 49 years. It is also possible to calculate for each model family type the distribution of person-years and income-years among three major groups--children, adults in families with children, and adults in families without children--shown in Table 8 in lines 2-4 and 6-8; and to compute the relevant measure of disparity, the TDM for T_{cca}-Tp, in line 10. Finally, using also the income cells for the several children-per-family groups from 1 to 6 & over, it is possible to calculate the more inclusive measure of income-per-person disparity contributed by the presence of children component, TDM for T_p-Y_p, in line 11.

The use of data from Table 3 to estimate the income per person for the model type families naturally transfers to the latter the disparities observed for a particular country for a particular year; and disregards the growth factor that would be found in per person income of a cohort of families observed over time. But we are concerned here only with the effects of differing numbers of children over the life cycle among the model families. And the cross-section pattern for another year would be the same, so long as per person income declines perceptibly with increases in the number of children in the family and with relatively narrow variations in the number of adults per family.

Two major conclusions stand out in Table 8. First, the cumulative

Table 8

Income per Person, Children and Adults, Family Types of Number of Children within the Life Span

	Family Types						Unweighted Total
	I (1)	II (2)	III (3)	IV (4)	V (5)	VI+VII (6)	(7)
Person-Years (T_p)							
1. Total	128.74	146.74	164.74	182.74	200.74	455.48	1,279.18
% shares in total, line 1							
2. T_c	14.0	24.5	32.8	39.4	44.8	51.4	39.4
3. Tca	31.6	38.5	41.1	40.8	38.3	31.2	35.9
4. Taa	54.4	37.0	26.1	19.8	16.9	17.4	24.7
Total Income (Y_p)							
5. Total ($ 000s)	506.1	513.5	522.2	526.3	525.8	1,030.0	3,623.8
% shares in total, line 5							
6. Yc	11.7	20.2	27.0	32.5	36.2	37.8	29.2
7. Yca	26.5	32.7	36.3	36.9	35.0	28.0	31.9
8. Yaa	61.8	47.1	36.7	30.6	28.8	34.2	38.9
Averages and Disparity Measures							
9. Income per Person, lifecycle span ($ 000s)	3.93	3.50	3.17	21.88	2.62	2.26	2.84
Income Instability within Lifecycle Span							
10. TDM, T_{caa}-Y_p	14.8	20.2	21.2	21.6	23.8	33.6	28.4
11. TDM, T_p-Y_p	14.6	20.2	23.2	27.0	30.4	43.6	34.6

Notes

The entries in lines 1-4 are based on the distributions of family-years by number of children- and adult-years shown for the seven family types in Table 7.

To the numbers of children and adult family years we applied

Table 8--continued

Notes--continued

the per person income for groups of families classified by the number of related children under 18 shown in Panel B of Table 3 for the United States. In $ thousands, they were; no children--4.46; 1 child--3.30; 2 children--2.62; 3 children--2.14; 4 children--1.77; 5 children--1.42; 6 & more children--1.16.

The TDIs in line 10 are analogous to that shown in Panel D of Table 3; in line 11 are analogous to that shown in Panel C of Table 3 (for P-Y).

per person income over the lifespan declines markedly as we move from Type I to Type VI-VII families, so that lifetime income of the latter is about 60 percent of the former. Second, the greater variability within the lifespan in the number of children and total persons per family, observed for the multichildren family types in Table 7, is now reflected in the greater variability in per person income, within the lifespan, in the families with the larger number of children. Thus, the TDMs, in both lines 10 and 11 rise steadily from column 1 to column 6--the more sensitive measure, when based on more than three divisions, rising more appreciably (compare line 11 with line 10, for columns 2 through 6). Incidentally, the measures for the unweighted totals of the seven model types in column 7 are again fairly close to those shown for Table 3; the TDM here for three major population groups, in line 10, at 28.4 is only slightly larger than the corresponding measure in Table 3, 27.4 (see line 22); and the measure for P-Y, in line 11, at 34.6 is somewhat larger than that in Table 3, at 31.8(see line 17).

The variability or instability over time introduces an element different from, and additional to, the disparity in total cumulative income per person over the lifespan. If two families secure the same total cumulative income per person over their lifespan, the family with greater instability of income over time would certainly be considered worse-off--on the premise that the negative impacts of the sharper trough on welfare, on possibility of long-term planning, and on vulnerability to short-term disturbances would hardly be offset by a sharper peak. Consequently, the time profile

of a family with a larger number of children over the lifespan is less favorable than that of a family with a smaller number of children. And these differences in the profiles associated with disparities in the number of children would be translated into cross-section differences among families within phases of the total lifespan--the greater, the wider the range among families in that phase in the number of children.

The illustrative examples used in this section could be explored further in a variety of ways--dealing with the time patterns through successive age-of-head classes for the different model type families; and, in particular, attempting combinations of the several types in cohorts, comprising all types and visualizing these cohorts in their succession over time. But for such exploration, which would permit us to derive both hypothetical cross-sections and a series of cohort lifespans, to be worthwhile, one would need a variety of data not now at hand, and beyond the feasible here. It seems best to end the illustrative discussion here, emphasizing only that in the case of multi-children families, a lower lifetime income per person is likely to be accompanied by substantial temporal variability in per person income--even allowing for effects of time profiles of income per family or per adult with changing age of head, and for those in growth trends in per person income.

6. Concluding Comments

We emphasized income disparities among families distinguished by differing numbers of children, because the latter seemed to us a major demographic factor affecting inequality in the distribution among persons

of both longer and shorter-term income. One main function of the family may be assumed to be the rearing of the next generation to satisfactory maturity, while providing adequate economic and living conditions for the parental generation. Given the major effects of differences in the number of children, ever born and surviving,on per person income of members of the family, both children and adults, and the substantial contribution that the results as measured here make to inequality in the distribution of income among members of the population, this demographic aspect of the income distribution appears to deserve deeper exploration than was feasible here.

The main finding here, illustrated in Tables 2 and 3, is that differences in number of children among families are associated with little positive variation in number of adults and in family income; while the number of children per family rises from 0 to over 6, the number of adults per family barely changes and the narrow variation is true also of total income per family. No wonder then that per person income drops so sharply from the high in no-children families to the low in the family class with most children. If these results are accepted, they are puzzling for they imply that among families there prevail wide differences in the desire for children[9]--differences that induce some families to have more children despite the depressing effect on per person income, in the long and in the shorter run.

One may, therefore, ask whether the results, as obtained here, are not misleading--in being secured with inappropriate concepts, and implications

of such concepts. Thus, it could be argued that children are not equivalent to adults in terms of their consumption needs; and that the appropriate reduction in the conversion of persons to consuming units, combined with the possible economies of scale in larger member families, would reduce substantially the disparities now shown on a per person basis between children and adults.[10] If so, the real reduction in per unit income, viewable as the cost of having more children, will be substantially reduced. But the difficulty is that the available conversions for a shift from per person to per consuming unit bases are all derived from the empirical data which reflect the effects of adjustments to a reduced income per person--rather than the consumption needs of children viewed as the future members of the next adult generation of producers. Our interest is in the meaning of reduced economic base for the children in terms of what this base, and the lower income of associated adults in the family, has for the capacity of the children when adults to contribute to social product. One may question whether, beyond the first few years of life, the consumption needs of children, when viewed from that standpoint, are significantly lower per child than they are per adult.

Alternatively, one might argue that our assumption that children do not contribute to income is due to the narrow definition of income, which excludes services rendered within the family household by members to each other. While it is true that market-oriented employment for children under 18 is exceedingly limited in a country like the United States, it is likely that in families with large numbers of siblings under 18, the older siblings

assist in the intra-family services and chores. If the value of these services, which are bound to be larger in multichildren families than in those with few children, are included, the addition to the per person or per unit income of the multichildren families will be proportionately larger and serve to reduce the income disparity. A similar but distinct argument would be to the effect that the intra-family household services and products of family members, excluded from the traditional concept of income (even if including market-oriented type of income in kind, in addition to money personal income), even adult members, would be proportionately larger in the multichildren families. But here again the difficulty lies in the possibility of a different result, if the quality of intra-family services is taken into account. To the extent that joint life and close bonds between adults and children in the family prevail, fewer hours devoted to services to family members in a higher income, smaller family, may weigh, in their contribution to bringing up the next generation as heavily proportionately as the greater number of hours devoted to these services in the lower income multichildren families.

A third argument might refer to services in kind provided to the households by the governmental sector, in the way of health care, education, and recreation--not now included in the conventional total personal income (which does include money transfers). Such services, particularly education and health care, are provided at low direct cost to both multi-children and other families; but they would presumably add a larger proportion to the family income of the families with the larger number of children. But here

again one may ask whether this is, in fact, true, with reference to say the educational services provided by the government (we are not considering the tax components of family income, which bear upon another aspect of the income comparisons). It may be argued that the educational services provided by the government to the children of the families with smaller number and at a higher conventional income level are far greater per child than would be true of those utilized by children in larger families at a lower income level. This distinct possibility is due to the differentiation in quality and level of education provided by the government sector, which provides a range of choice that favors those members of the children population who can take greater advantage of the longer and more advanced type of education. And there are elements of such choice in recreation, and even health, services provided by the government.

All of these are, of course, conjectural arguments. Their purpose is to suggest that some plausible results of allowing for conventional conversions from persons to consuming units, of expanding family income to include intra-household services of family members, and of including in family income the value of services in kind provided by the government (or other social institutions), may be only plausible rather than valid. But, due to limitations of knowledge, one can only speculate.

In particular, we do not know, with the data used here, how the family income, or better, consumption is apportioned among the members, children and adults, young and old. All that the data tell us is that family income, money income here and market-oriented income in general, is lower per member

of the family when the latter includes more children. To be able to evaluate the effects of this difference on the growth of the children as future active economic agents, and even on the growth of the productivity of the adult members over the lifespan of the family unit, we need an insight into the internal economic structure of the family. It is quite possible that different socio-economic groups among families, at similar levels of per person income and similar proportions of children to adults, have different allocations of consumption between children and adults--and different provisions for engagement of the family members, young and old, in intra-family services.

All that one can do so far is to call attention to the results of the comparisons, even if only for one developed country; speculate on their consequences; and muse on the important questions that arise. The questions are about the significance of the association of low per person income with more children per family for the long-term trends in economic differentials within the current and later generations.

FOOTNOTES

[1]For a detailed discussion of these two associations see my paper, "Size of Households and Income Disparities," to be published in Julian L. Simon and Peter H. Lindert, eds., Research in Population Economics, vol. 3, 1981, pp. 1-40 (JAI Press, Greenwich, Connecticut).

[2]Further search, not feasible here, might reveal similar data for other countries. In absence of such a search, the data used here are illustrative.

Families in the available U.S. data, are defined as units the members of which are related by blood, marriage, or adoption; and residing in the same quarters (with some exception for members away at colleges or other schools). Households are units that share quarters and living arrangements, with the members not necessarily related by blood, marriage, or adoption (although the dominant proportion of households are family households). Families exclude individuals not related to the head, such unrelated individuals either residing alone and forming one-person households, or living within multiperson households with other members to whom they are not related. In the size-of-unit classification, the family groupings begin at two persons; the household groups begin at one person.

[3]This interpretation of the TDM as a simplified Gini coefficient was suggested to me by Dr. Shirley W.Y. Kuo, in connection with my 1975 paper in Income Distribution and Employment in Southeast and East Asia, vol. II, July 1975, Tokyo.

[4]This would certainly be true of income from labor service, but may also be true of pure property incomes. The labor force participation ratio for the United States in 1970 is shown as 0.6 percent for population 0-14, 42.5 percent for population 15-19, and 51.4 percent for population 20-24 years of age (see International Labour Office, Labour Force 1950-2000, Estimates and Projections, vol. IV, Table 2, p. 9, Geneva, 1977). If we assume that the total population 15-17 is 70 percent of that for the five year class 15-19; and that the labor force participation ratio for the 15-17 age class is 33 percent (which implies a participation ratio of 65 percent for the 18-19 subclass), the over-all labor force participation ratio for the population of children under 18 works out to 6.5%. In terms of possible labor income the fraction would be much smaller.

[5]This is literally true only if, while omitting all children, we retain the size classes by number of persons now shown in Panels A and B. If, combined with omission of children, we were to allow a reclassification of families by number of adults, the distribution would show a greater range in number of adults per family. But the point is that we are interested here in the contribution of children (and adults) to size-differentials among families by the total number of persons per family--for it is the latter that are given to us by the data, and result in the income disparities per person with which we are concerned.

This comment applies also to the inferences in the next paragraph, concerning the contribution of children to the P-Y disparity.

[6]The measures are taken from my paper, "Demographic Aspects of the Size Distribution of Income: An Exploratory Essay," in Economic Development and Cultural Change, vol. 25, no. 1, October 1976, Table 10, p. 34.

[7]A housing unit is defined as "a house, an apartment or other group of rooms, or a single room...occupied or intended for occupancy as separate living quarters; that is, when the occupants do not live and eat with any other persons in the structure and there is either (1) direct access from outside or through a common hall or (2) a kitchen or cooking equipment for the exclusive use of the occupants." (See Source I, p. 8.)

[8]For more detailed illustrations of model types of families with different numbers of children assumed for each, see tables and discussion in the next section.

[9]An easy alternative explanation might be that the results are due to error, or more realistically to a lag in the response of families to rapidly changing circumstances, which were unforeseen and which introduced a major disparity in per person income associated now (but not in the past) with the differences in numbers of children per family. But this explanation is not warranted by U.S. experience in recent decades, however it might be considered in connection with the rapid declines in mortality in recent decades in the less developed countries. A glance at data, similar to those used in Table 3, for both earlier and later years in United States, in the span from 1950 to 1979, suggest patterns similar to those found for 1969-70 in Table 3.

[10]See brief illustration and discussion of these conversions in the paper cited in footnote 6 above, Table 9, p. 31, and discussion on pp. 30 and 32-3.